PARTHENOGENESIS AND LACK OF INBREEDING DEPRESSION IN THREE LABORATORY POPULATIONS OF THE DESERT LOCUST, *SCHISTOCERCA GREGARIA*

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INTRODUCTION

Tychoparthenogenesis (i.e. facultative parthenogenesis) may be the first evolutionary step to parthenogenesis.

Its hatching success is expected to be low (10^{-5}) due to inbreeding depression or ploidy issues during development *(offspring are fully homozygous and may be a mosaic of haploid and diploid cells).*

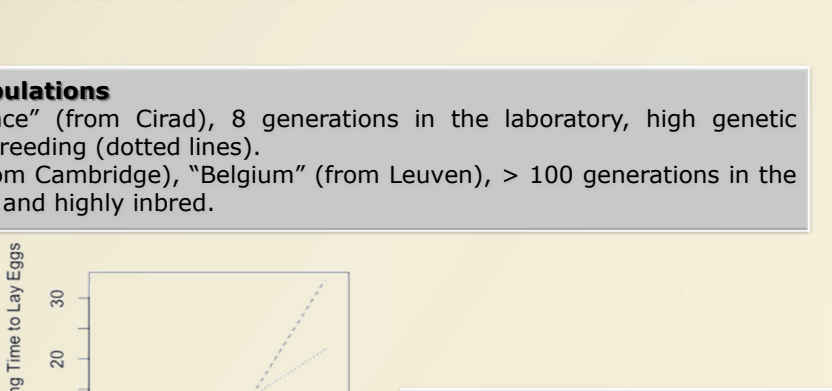
In Desert Locust, high hatching rate (30 %) has been observed in a lab population (Hamilton 1954).

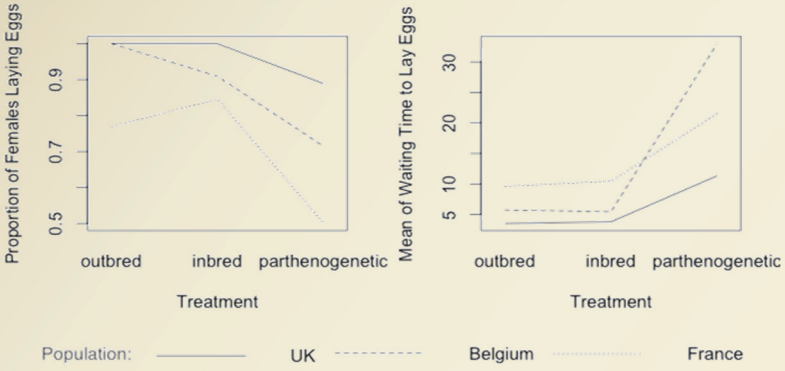
Hypothesis: in more inbred populations (having purged inbreeding depression), tychoparthenogenesis may be less costly and show higher hatching rate.

Method: comparison of tychoparthenogenesis (reproduction, hatching and larval development) + measures of inbreeding depression (comparison of inbred and outbred in 3 laboratory populations.

RESULTS

Inbreeding history of lab populations
1 recent lab population: "France" (from Cirad), 8 generations in the laboratory, high genetic diversity (black squares), no inbreeding (dotted lines).
2 old lab populations: "UK" (from Cambridge), "Belgium" (from Leuven), > 100 generations in the laboratory, low genetic diversity and highly inbred.





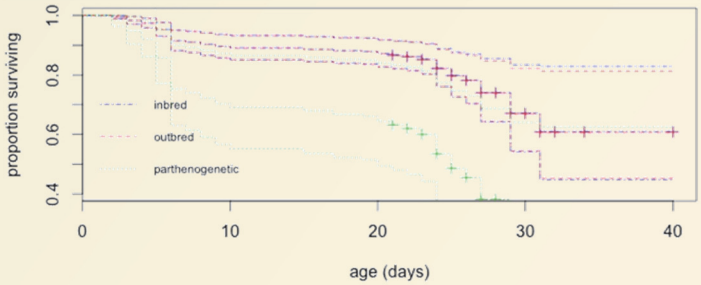
Lower laying rate and longer waiting time before laying eggs in parthenogenetic treatment: avoidance of parthenogenesis… but no inbreeding avoidance.

Significant differences between populations, especially regarding parthenogenesis.

Much lower hatching rates in the parthenogenetic treatment (0.16 ± 0.22) than in either the inbred or outbred treatments (0.7 ± 0.3).

No effect of treatment in the timing of larval development (but an effect of population with longer development in Belgian offspring).

Lower survival rate for parthenogenetic offspring.



Survival curves in the UK population. Central curves are surrounded by 95% confidence intervals (inbred and outbred survival curves are indistinguishable).

CONCLUSIONS

Parthenogenesis is not very successful in the desert locust and laboratory populations vary in their ability to reproduce parthenogenetically.

Differences in parthenogenetic reproduction may not be do to a purge of inbreeding depression (no real sign of inbreeding depression in all 3 populations and old inbred Belgian population does not show more successful parthenogenetic reproduction than recent French population).

The ability to reproduce parthenogenetically may be an artifact of random processes from when the populations were brought into the lab **or linked to other traits that have been selected for in the laboratory**.

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